



## AAR-100

### Human Factors Newsletter # 00-17

(September 23, 2000 – October 6, 2000)

- **ASDE-X:** Human factors researchers at the William J. Hughes Technical Center conducted an ASDE-X Visual Specification Working Group meeting earlier this month. The meeting included representatives from NATCA, PASS, the Program Office, and the Air Traffic Requirements Service. The members reviewed the current design and conducted prototyping activities for new or revised parts of the computer-human interface. (M. McAnulty, WJHTC)
- **SABET:** An ATC area supervisor from Indianapolis Center (ZID) is on a two-week detail with the William J. Hughes Technical Center (ACT-530). The supervisor is responsible for documentation of the roles and responsibilities of three multi-sector controller position alternatives in preparation for the Study of an ATC Baseline for the Evaluation of Team-configurations (SABET). During the detail, the ZID supervisor will also participate in simulation development for the SABET experiment. SABET is scheduled to start at the end of November 2000. (B. Willems, WJHTC)
- **Display Alternatives for Reducing Complexity (DARC):** The DARC study completed its second week of data collection at the William J. Hughes Technical Center. The study investigates the reduction of cognitive complexity in ATC through systematic application of redundant graphical and textual cues. Two air traffic controllers participate each week. DARC will run four weeks with participants representing En Route Centers from throughout the country. (T. Yuditsky, WJHTC)
- **Aviation Security Human Factors:** The Human Factors Panel Review met on September 28th (with AAR-100 representation) to review the FY00 aviation security human factors projects and efforts, and to preview (and coordinate) the FY01 major Strategic Implementation Plan (SIP) initiatives. Opportunities for collaboration among common areas will be identified. (G. Hewitt, AAR-100)
- **Human System Integration Technologies and Tools:** AAR-100 representatives presented lessons in the application of human factors to the Human System Integration Technologies, Tools, and Techniques Seminar conducted Sep 25-26 in Arlington, VA.

The seminar, which was sponsored by the Human Research & Engineering Directorate of the U.S. Army Research Laboratory, provided insight into lessons learned and future challenges related to the use of tools and methods within the human factors arsenal. A demonstration of some new and emerging techniques was offered to the attendees. (G. Hewitt, D. Piccione, AAR-100)

- **Society of Automotive Engineers G-10 Meeting.** A Volpe researcher attended the meetings of the Society of Automotive Engineers G-10 committee on Aerospace Behavioral Engineering Technology in San Diego, California. The purpose of the trip was to observe and participate in the activities of subcommittees that were relevant to the research conducted by multiple Volpe Center human factors researchers. Priorities were to attend the Realistic Training, Charting, and the combined Multifunction Display /Head-up Display subcommittees. The researcher also attended a demonstration of the Jeppesen Flight Deck software on a ruggedized Fujitsu Stylistic computer. (A. Kendra, VNTSC)
- **Electronic Flight Bag (EFB):** Researchers from Volpe and Battelle attended a meeting of the Air Transport Association Digital Data Working Group in Atlanta, GA where they obtained feedback on a near-final draft of a document entitled “Human Factors Considerations for the Design and Evaluation of Electronic Flight Bags, Version 1: Basic Functions.” This document is intended to facilitate the development of FAA advisory material for the evaluation and operational approval of EFBs. It will be accessible to users and manufacturers for use in system design and development. The document was released as a final report to the FAA sponsor and others on September 28, 2000 (Report No. DOT-VNTSC-FAA-00-22). This work will be presented at the 19th Digital Avionics Systems Conference in Philadelphia this month. (T. McCloy, AAR-100; D. Chandra, VNTSC)
- **Propulsion System Malfunction & Inappropriate Crew Response Industry-Government Meeting:** A Volpe researcher attended a meeting of the Propulsion System Malfunction & Inappropriate Crew Response Industry-Government group hosted by General Electric Aircraft Engines in Springdale, OH. The group finalized the preparation of materials intended to enhance training in recognizing and responding to turbofan malfunctions that have been associated with inappropriate crew responses in recent incidents and accidents. For example, compressor surges, a relatively minor malfunction that can produce a startling loud bang, have led pilots to reject takeoff after passing the decision speed. To reduce the chance of such events, the group prepared a text describing turbofan operation and selected malfunctions, a video illustrating the malfunctions, and specifications for representing the malfunctions in training simulators. These training materials will be distributed to air carrier training centers as early as November. T. McCloy, AAR-100; M. Zuschlag, VNTSC)
- **Fly-Over and Fly-By Waypoint Symbols Study:** A Volpe project memorandum was finalized on the findings of a short-term empirical study on human factors issues related to the selection of symbology for fly-over and fly-by waypoints on aeronautical charts (Report No. DOT-VNTSC-FAA-00-23). At issue were the international standards for the

depiction of these symbols. The symbols in use by the United States (US) and the International Civil Aviation Organization (ICAO) are currently in conflict. Because fly-over waypoints are often used to ensure obstruction clearance, it is critical for safety of flight that the symbols are unambiguous and salient to pilots. Results of the study were presented to the ICAO OCP at their June 2000 meeting in Madrid. This group supported a change to the ICAO standard fly-over symbol based on this research. (T. McCloy, AAR-100; D. Chandra, VNTSC)

- **Effects of New Antihistamines and Hypoxia on Performance:** A project outline and test protocol for the use of human subjects in a research program to study the key factors affecting pilots at various altitudes was approved by CAMI's IRB. The NTSB has listed antihistamines as a factor in several fatal aviation accidents and research is needed to determine the interaction of antihistamines and hypoxia. CAMI researchers are in the process of setting up the instrumentation and hypobaric chambers for this research. (J. Whinnery, CAMI)
- **In-flight Medical Emergencies and Defibrillator Usage:** The following report was published as an OAM report to comply with public Law 105-170, 105<sup>th</sup> Congress, "Aviation Medical Assistance Act of 1998": "Evaluation of In-flight Medical Care Aboard Selected U.S. Air Carriers: 1996 to 1997," DeJohn, C., Veronneau, S., Wolbrink, A., and Larcher, J. *Flight Safety Foundation Cabin Crew Safety*, 35(2). This research suggests that a minimum of 4 lives will be saved every year by implementing this NPRM. The following NPRM was a direct result of the research:[4910-13], DEPARTMENT OF TRANSPORTATION, Federal Aviation Administration, 14 CFR Parts 121 and 135, [Docket No. FAA-2000-7119; Notice No. 00-03], RIN 2120-AG89, Emergency Medical Equipment. (J. Whinnery, CAMI)
- **DNA probes as a tool in the identification of postmortem alcohol:** Research on this subject was published as an OAM report. Several recent high profile aviation accident investigations have identified alcohol which later proved to be postmortem microbe-produced alcohol and not ingested alcohol. Finding alcohol in a pilot is a significant finding if the alcohol came from ingestion. Alcohol could be considered the cause of accident when in fact the alcohol formed in the body after death. This would damage the reputation of the pilot and the airlines and lead to a false conclusion as to the cause of the accident. New state-of-the-art DNA probes developed through this biochemical research effort have been used in the identification of ingested ethanol. Researchers at CAMI have tested the new DNA probes on specimens from actual cases and the probes have been effective in identifying ingested ethanol. These probes will help identify pilots who have ingested ethanol and to exonerate those pilots who have not ingested ethanol. This research will reduce unnecessary litigation which causes the federal government to pay millions of dollars in unwarranted litigation costs. (J. Whinnery, CAMI)
- **Chemical Biological Threat Analysis:** The initial steps regarding both cabin airflow simulation development and data collection for validation in CAMI's 747 Cabin Evacuation Simulator (CES) were taken. A variety of information regarding the project was forwarded to the University of Tennessee Computational Fluid Dynamics Laboratory

to initiate development of model parameters. Numerous measurements and reviews of the 747 CES were made in the context of implementing necessary structural modifications. Anemometers for the three-dimensional measurement of airflow's in the 747 CES were identified and procurement requests submitted. Researchers also developed an overview of the project and presented it to the William J. Hughes Technical Center representative working the chemical weapons threat issue. (J. Whinnery, CAMI)

- **Cabin Evacuation Research:** A project outline and test protocol for the use of human subjects in a research program to study the key factors affecting passenger egress flow rate through cabin emergency exits was submitted to CAMI's Institutional Review Board. This program will address issues raised by NTSB recommendations critical of recent FAA policy and regulatory actions regarding passageway exit width for egress through Type III over wing exits. The program's protocol and methodology will be presented at an ARAC committee meeting at CAMI. (J. Whinnery, CAMI)
- **Seat-Occupant Modeling:** A three-month license for the evaluation of the computer impact simulation application, MADYMO, has been acquired. The program will be evaluated by FAA engineering staff at the LAACO, TAD, CAMI, WJH Technical Center, Denver ACO, Atlanta ACO, and Headquarters FAA. MADYMO provides the capability to perform kinematics modeling of solid-body as well as FEM representation of structures. It also incorporates a wide range of ATD and human body models in the application's database. A three-day introduction/familiarization class for the engineers who will be involved in the evaluation of MADMO was held in mid September. A decision to procure this resource may be made by the second quarter of FY01. (J. Whinnery, CAMI)
- **Child Safety Restraints for Commercial Air Transport Passenger Seats:** The SAE Aerospace Council has formally approved Aerospace Standard AS 5276, which defines performance criteria based on a dynamic test condition to assess the safety of child restraints installed in transport passenger seats. The FAA will consider this industry standard as a basis for the re-issuance of TSO C-100. (J. Whinnery, CAMI)
- **Safe Flight 21:** In September, scientists from CAMI, the William J. Hughes Technical Center, and Volpe participated in the Safe Flight 21 OpEval-2 Coordination Group Meeting 4 and ILAB3 at the MITRE Center for Advanced Aviation System Development (CAASD). While there, the researchers briefed the OCG on human factors data collection questionnaires and forms, and tested these materials in preparation for OpEval-2, which is scheduled for Louisville, KY on October 25-30. (K. Joseph, R. Prinzo, CAMI; M. McAnulty, WJHTC; E. Nadler, A. Yost, Volpe)
- **Controller Communication:** CAMI representatives provided a briefing to AAR-100 concerning research findings from the R-side/D-side teamwork studies. The research involved collaboration with scientists from the William J. Hughes Technical Center. Based on the results of the briefing, AAR-100 recommended that the two organizations continue to collaborate on research involving the impact of new technology and ATC team configuration on controller-to-controller communication/coordination. (P. Krois, AAR-100;

L. Bailey, CAMI)

- **General Aviation Maintenance:** CAMI participated in the National Air Transportation Association's fall committee meeting that was held in Dallas, TX. Researchers provided a presentation to the committee on CAMI's human factors research plans involving General Aviation Maintenance. The committee provided valuable input into the ongoing analysis of the accident database. The research design has been modified so that the analyses and results will respond to specific concerns of the committee. (E. Fiedler, CAMI)
- **URET:** Human factors researchers observed controllers using the User Request Evaluation Tool (URET) at the Memphis En Route Air Traffic Control Center. Discussions with facility and other personnel were focused on how results from the Flight Strip Observation Study might be incorporated into URET. The observation study team also discussed plans for briefing AOZ sponsors regarding outcomes from the research and applications of those findings. (C. Manning, CAMI)
- **Shift Work Study:** Human factors researchers traveled to Houston, TX to meet with Jim Beadling (NATCA, Article 55 Co-Chair), the temporary employees responsible for data collection, and to observe the beginning of the data acquisition phase of the Congressional Shift Work Field Study. Sixteen local temporary employees were interviewed and hired as data collectors for the study. The Houston ARTCC Security Officer fingerprinted and processed background checks for the employees. Researchers coordinated with facility management and NATCA to integrate 60 ATCS volunteers into a complex, yet executable, schedule which began October 1, and continues until November 11, 2000. (T. Nesthus, CAMI)
- **Briefings:** A CAMI researcher traveled to the William J. Hughes Technical Center to observe data collection for a collaborative study on display enhancements. The researcher also traveled to Washington, D.C. to provide a briefing for Free Flight Phase 1 (AOZ) employees regarding the results of the flight strip observation study. Plans were made to conduct additional briefings in October. (C. Manning, CAMI)
- **Op-Eval 2:** CAMI representatives traveled to the Tower Cab and TRACON in Louisville, KY to conduct a site visit and familiarization tour, in preparation for Op-Eval 2. Representatives from the William J Hughes Technical Center, Volpe Transportation Center, and MITRE also participated. During the visit, they met with facility, NATCA, and Op-Eval support staff to discuss logistics and gain some familiarity with the facility, ATC workstations, and the shadow-mode display designated for Op-Eval 2. (R. Prinzo, CAMI)

*More information on human factors research can be found at  
the FAA Human Factors (AAR-100) web site: <http://www.hf.faa.gov>*

Mark D. Rodgers  
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**October 10-12, 2000-** World Aviation Congress and Exposition, Town and Country Hotel, San Diego, CA <http://www.sae.org/calendar/wac00/index.htm>

**October 15-19, 2000-** Human Performance, Situation Awareness & Automation: User-Centered Design for a New Millennium, Marriott Riverfront, Savannah, GA  
<http://www.ie.msstate.edu/hpsaa/index.html>

**October 22-26, 2000-** ATCA 45<sup>th</sup> Annual Technical Program and Exhibits, Taj Mahal Resort, Atlantic City, NJ <http://www.atca.org/>

**October 30-November 1, 2000-** Aviation 2000 Exhibition and Conference, Omni Shoreham Hotel, Washington, DC <http://www.aviationtoday.com/aviation2000>

**October 31-November 2, 2000-** 10<sup>th</sup> International Aviation Security Human Factors Technical Advisory Group Meeting at SEATAC Airport, Washington.

**November 6-9, 2000** - DOD HFE TAG-45, El Paso, Texas.  
<http://dticam.dtic.mil/hftag/index/html>

**November 15-16, 2000-** Avionics 2000, 14<sup>th</sup> Annual Conference and Exhibition, Renaissance London Heathrow Hotel, UK <http://www.era.co.uk/conf/confpage.htm>

***March 27-29, 2001-** The Fifteenth Symposium on Human Factors in Aviation Maintenance, The Brewery Conference Centre, London, UK [mail to: enquiries@conferenceconsultancy.com](mailto:enquiries@conferenceconsultancy.com)*

**March 31 – April 5, 2001-** CHI 2001, Seattle, WA <http://www.acm.org/chi2001>

**June 3-8, 2001-** Society for Information Display, International Symposium, Seminar & Exhibition, San Jose Convention Center, San Jose, CA [mail to: pdrzaic@elink.com](mailto:pdrzaic@elink.com)

**October 2001-** Annual Cabin Safety Research Technical Group Meeting, Taj Mahal Hotel and Casino, Atlantic City, NJ

*Note: Calendar events in Italics are new since the last Newsletter*



Comments or questions regarding this newsletter?  
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